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Nigeria Agricultural Policy Project

GROWTH AND TRANSFORMATION OF CHICKEN & EGGS VALUE CHAINS IN NIGERIA

By

Saweda Liverpool-Tasie, Bolarin Omonona, Awa Sanou, Wale Ogunleye,
Samantha Padilla, and Thomas Reardon



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Abstract

Using data from multiple sources we explore the dynamic growth and transformation that is taking place in the Nigerian poultry subsector. We find that increased consumption of poultry products in Nigeria is occurring alongside rapid urbanization and growth in the poultry industry. In just one decade, the volume of feed used in Nigeria skyrocketed from 300 thousand to 1.8 million tons – a 600% climb.

Contrary to the idea that Nigeria is inundated with illegal imports of poultry products, we find that domestic production covers about 85% of domestic consumption, and (illegal) imports appear to be only about 15% of consumption. This indicates that efforts towards addressing illegal smuggling of poultry products into Nigeria should be supplemented with at least equal effort to ensuring the sustainable growth of domestic poultry production in the country.

In contrast to numerous assertions that poultry production in Nigeria is predominantly in the south, we see that the North has about 60% of the share of small farmers' chicken holdings versus 40% in the south. We did find, however, that the emerging medium-large scale chicken farms, producing about 10-20% of Nigeria's chicken and eggs, are indeed mainly in the South. The importance of chicken and egg production by small farmers in the North however calls for at least as much attention to the North as is given to the South in discussions on and programs designed for the subsector. Chicken production in the North appears to be very important to small holders. Farmers in the hinterland (far from major markets which tend to be in towns/cities) in the north tend to have twice as many birds as those far away from markets in the South. With such high poverty rates in the North, support for smallholder chicken farmers in the North could address poverty and food security concerns. This will also be important for small farmers in the South.

Both consumption and production of chicken in southern Nigeria are relatively spatially concentrated toward the big demand magnets of the urban and peri-urban areas. This implies that increases in egg demand as incomes rise and urbanization proceeds is best availed where there is significant investment in rural infrastructure connecting to the dynamic urban demand motors, especially rural feeder roads direct to towns and connecting to inter-urban corridor highways.

1. Introduction

The traditional food economy of West Africa has long been characterized in policy and research circles as poor and under-developed. The sub region is often associated in “conventional wisdom” with traditional food habits narrowly limited to grains and root staples and sauces, and with rural households relying mainly on home-consumption from own-farming but not market purchases. In strong contrast to the traditional view, recent evidence from nationally representative data presents a dynamic and diverse food system in the region.

In Nigeria, urban and rural households’ diets are rapidly transforming. There is a clear trend of diversification beyond staples into horticulture, animal proteins, and dairy. Animal proteins alone account for about 15% and 20% of the food budget in rural and urban areas respectively. As incomes rise and Bennett’s law sets in, Nigerians are eating more red meat, chicken, and fish. According to Sahel capital (2015) based on OECD data, Nigeria’s poultry meat consumption per capita in 2014 was about 1.41kg (note that our calculations from LSMS survey data put this at about 2kg in 2010). This compares to about 7kg in Ghana, over 30kg in South Africa, and over 40kg in the USA. However, the FAO projects that meat consumption in Nigeria will increase by about 75% over the next decade (Sahel Capital, 2015). Meeting current and future demand can come from two sources: imports (which are currently formally banned but still occur) and domestic production. This implies a huge potential for the domestic poultry sub-sector in Nigeria.

Despite this huge potential, there has been very little empirical research on the Nigerian poultry value chain, from the maize farmers (largely in the North) to the poultry feed mills, from mills to poultry farmers (all over the country), from chicken farmers to poultry processors and retailers, and the wholesale links among those segments. There is limited empirical evidence on the specific structure and conduct of the poultry value chain and how this has changed over time. Who is involved and how has that changed? Which strata of actors are adopting feed and other new technologies and what constrains diffusion? Where along the chain do different actors tend to operate? What opportunities and/or challenges persist along the chain? Who is able to benefit from existing opportunities and who can withstand the challenges? With increasing youth unemployment and a desire for increased female participation in welfare enhancing opportunities, this has implications for setting the right agenda and developing the necessary policy framework to support a successful and inclusive expansion of the industry. This report takes an initial step towards improving the understanding the structure and performance of the Nigerian poultry subsector using a combination of secondary data sources and rapid reconnaissance. We will follow this initial view with a detailed field survey of all the segments of the chicken and egg value chains in Nigeria addressing questions left unanswered by the present report, but building on the new insights here.

Our data sources are as follows. First we use the Nigeria Living Standard Measurement Study-Integrated Survey on Agriculture (LSMS-ISA), from 2010. This is a multi-dimensional nationally representative survey with detailed information about rural and urban households’ assets, demographic characteristics, consumption, and various household practices including agricultural production, businesses, and non-farm wage work. The data include about 5,000 households from over 400 enumeration areas (EAs). The interviews occurred in the post-planting and post-harvest periods (World Bank, 2013).

Second, we supplement the LSMS-ISA data with the United Nations' Comtrade data, with FAO data, and several other secondary sources including earlier empirical studies in Nigeria and comparison with studies in other regions especially Asia.

Third, we gathered information through a rapid reconnaissance of the poultry subsector in the Ibadan area in 2015 and 2016. This involved 10 visits to poultry farms (small, medium, and large) in the Ibadan area where farm managers were interviewed about their production and marketing operations and perceptions of the dynamics of the subsector over the last 15-20 years. We visited about 15 other actors along the poultry value chain including feed mill owners/operators, poultry product (egg and chicken) retailers, poultry processors, cold room operators and fabricators, veterinary service providers, transporters, and maize aggregators (largely in Northern Nigeria). This reports summarizes the major findings from the analysis of these data.

2. Domestic Supply of Chicken & Eggs growing fast

Figure 1 shows the growth in chicken and eggs over three decades. Several messages emerge.

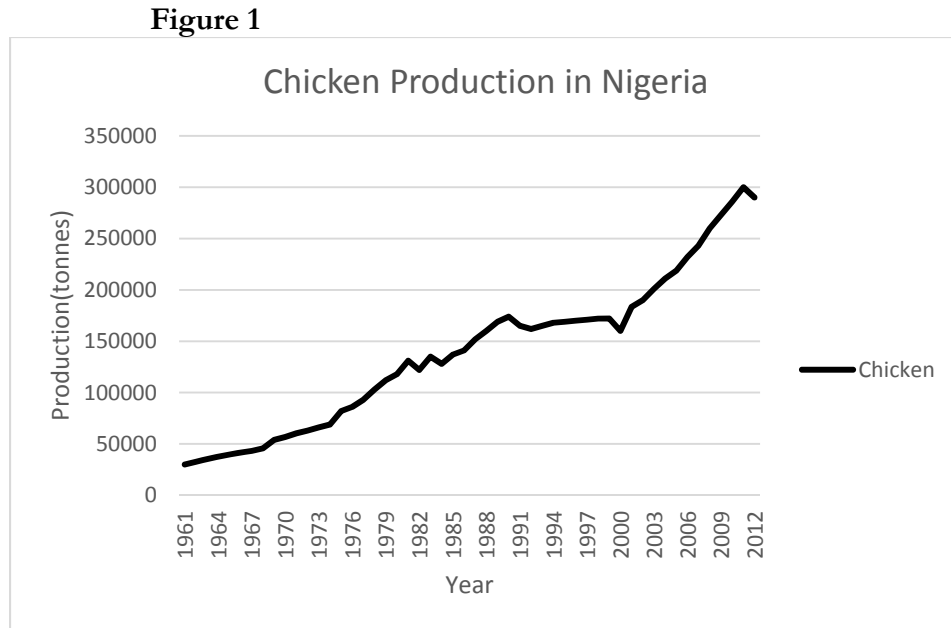
First, eggs and chicken output have grown fast over three decades, with fastest growth in the 2000s (when urbanization and income growth was fastest).

- Egg output grew 300% (three-fold) from 1980 to 2012, with a strong uptick in the 2000s: 1.2 times in 1980s, 1.3 times in the 1990s, 1.6 times in the 2000s.
- Chicken output grew 220% (2.2 times) from 1980 to 2008. There was an uptick in the 2000s: 1.4 times in the 1980s, 1.0 times in the 1990s, and 1.6 times from 2000 to 2008.
- These growth rates are similar to rates in countries with comparable GDP/capita in Asia, such as the Philippines, where chicken output increased 1.8 times in the 1990s and 1.4 times in the 2000s. "Bennett's Law" predicts that expenditures of consumers on animal proteins and horticulture products rise disproportionately (compared with basic grain staples) as incomes rise, so these rapid increases of chicken and egg production and consumption we see in Nigeria and Philippines are as expected.

Second, while the growth in output was rapid, the growth over 1990 to 2010 no more than tracks population growth. The latter grew by a factor of 1.8 during that time. As there was a strong uptick (before the flu) of output in the 2000s, output just "caught up" with population growth with a surge of output in the past decade.

Third, the ratio of chicken meat to eggs went from 1:2 in 1967 to 1:2 in 1990 to 4:10 in 2000 to 4:10 in 2008. This shows a steady rise over the decades of the relative importance of eggs. This fits with the picture of emerging income growth in the 1990s and 2000s when households moved to "emergent animal protein consumption" in the form of more egg consumption. It is moving from a traditional luxury food infrequently consumed to a convenience food in breakfast and lunch both at home and in eateries (often now with wheat noodles, Indomie produced by Dufil, an FDI arm in Nigeria of Indonesia/Singapore giant processor, Indofoods).

Fourth, the consumption (compared with output) rise was a little more than the domestic output rise due to modest imports; as we show below, imports of chicken are now about 10-15% of total consumption. But that small share means that output trends basically track consumption trends overall.



Source: Generated by authors from FAOStat data. Notes: Chicken is defined as “Fresh, chilled or frozen. May include all types of poultry meat if national statistics do not report separate data” (FAOStat).

3. Growth of Demand & Supply of Feed – and North-South Maize supply chain to feed mills

Figure 2 shows the growth of maize sent to feed mills in Nigeria over the past decade (2003 to 2015); Figure 3 shows the share of Nigeria’s maize going to feed mills. Several points are important.

First, the volume skyrocketed from 300 thousand to 1.8 million tons – a 600% climb in just one decade! This is one of the most spectacular feed sector developments in the world. It is driven both by massive investments in large feed mills such as Chi Farms and Zartech in Southwest Nigeria, and in a growing number of small and medium enterprises dispersed in chicken production areas (CAC).

Second, note that the increase in feed output was 4 times that of the increase in volume of chicken. This implies the emergence of basic technological change in chicken & egg farming – from backyard production with locally gathered fodder or free range production, to more intensive production in enclosures – the first step in modernization of a poultry sector. This path is similar to what occurred in the US and Europe in the 20th century, and China and Southeast Asia recently.

Third, the share of Nigeria’s maize going into feed mills jumped 300% over the decade – from only 7% to 23%! The 300% rise makes sense when one notes that maize output rose 2 fold (from 5 million to 10 million tons, roughly, during the period (FAOSTAT)). Hence the feed industry is becoming an important market for farmers.

Fourth, most (about 85%) of the maize in Nigeria is produced in the North. Moreover, Southern feed mill respondents in our rapid reconnaissance noted that most of their maize comes from the North via long supply chains. This is a benefit and opportunity for the North and a boon for the South. But it is also a challenge as weather (short term shocks and long term climate change), fuel shortages, transport costs, and socio-political disruptions make a long supply chain from North to South vulnerable.

Figure 2

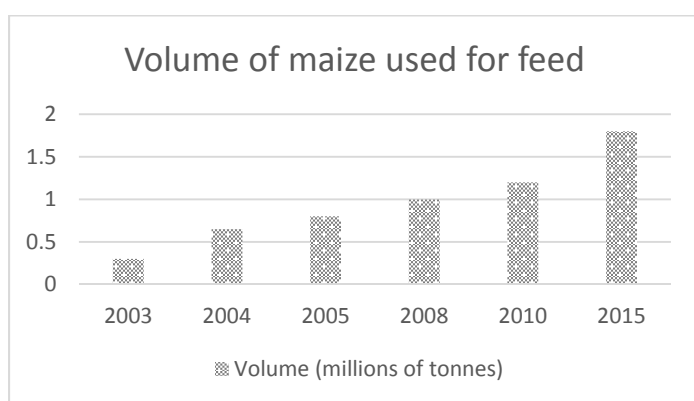
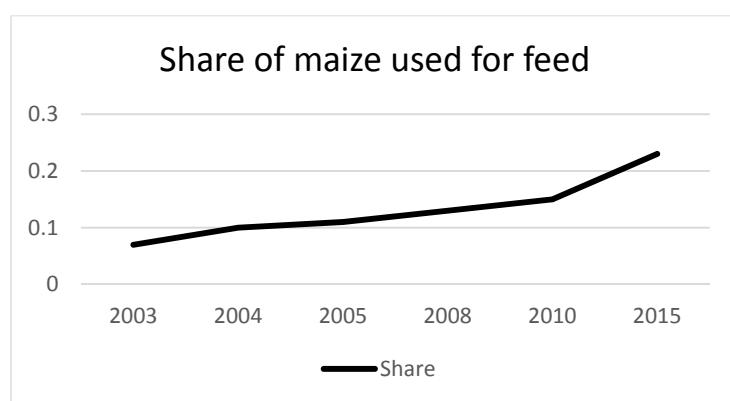


Figure 3



Source: Generated by authors from United States Department of Agriculture (USDA)

4. Dominance of domestic supply - imports are far smaller share than conventional wisdom says

Table 1 shows the level and source composition of chicken in 2010. We find that domestic production covers about 85% of domestic consumption, and (illegal) imports appear to be only about 15% of consumption. This finding is important for the debate because it is widely held that Nigerian chicken is very non-competitive in the market and swamped and displaced by imports. We do not think the data and the observed situation support that idea. Several points are to note.

First, we calculated total chicken consumption in Nigeria by extrapolation from the LSMS 2010 survey data. We took the total consumption of chickens among the roughly 16 million consumers that noted they consumed chicken and extrapolated the total LSMS sample size up to the national sample size to obtain a total consumption “pie” of about 300 million chickens (for any source). This is about two chickens per Nigerian per year.

Second, we calculated small farmer holdings of chickens from the same survey, and extrapolated similarly. The total was 200 million in 2010. This may be a conservative estimate because this assumes that the reported chicken holdings at the moment of the survey were the stock held for one year. However, the life cycle of broilers is typically much shorter than that (as the chickens are slaughtered each trimester roughly) and layers typically longer (living several years before slaughter). But we do not have detailed information from the survey on the shares of broilers and layers held by the households so we abstracted from that.

Third, we calculated the number of medium and large farms producing chicken. This varied from 25 million birds (from the list of the medium and large farms registered by the government's CAC) to 50 million (estimated by the Nigerian Veterinary Research Institute). Even this range may be a conservative estimate as these ranges do not include huge operations like Zartech and Chi Farms that are classed as vertically integrated companies.

Table 1: Chicken production, consumption, and import figures for Nigeria in 2010

	Descriptions	Values
<i>LSMS extrapolations (2010)</i>		
	Total chicken consumption (number of chickens) LSMS	300,000,000
	Small farmers holdings - LSMS	200,000,000
	Medium and large farms holdings - CAC	25,000,000
	Gap between demand and supply likely met by imports	75,000,000
<i>Comtrade (2010)</i>		
	Total exports to Nigeria (\$US)	100,617,456
	Total exports to Nigeria (kg)	58,704,128
	Total exports to Nigeria (number of chickens)	39,136,085
	Exports to Nigeria from Benin (\$US)	94,822,814
	Exports to Nigeria from Benin (kg)	55,136,976.00
	Exports to Nigeria from Benin (number of chickens)	36,757,984
<i>Comtrade extrapolations (2010)</i>		
	Exports to Benin (\$US)	203,312,173
	Exports to Benin (kg)	143,430,747
	Percentage of Benin exports to Nigeria (assumption)	0.75
	Imports to Nigeria from Benin (kg)	107,573,060
	Imports to Nigeria from Benin (number of birds)	71,715,374
<i>Wall Street Journal</i>		
	Frozen chicken imports to Benin - 2010 (\$US)	30,000,000
	Price per chicken - average of number used by Sahel Capital (\$US/kg)	3
	Frozen chicken imports to Benin - 2010 (number of birds)	10,000,000
	Frozen chicken imports to Benin – 2014 (\$US)	42,600,000
	Frozen chicken imports to Benin - 2014 (number of birds)	14,200,000
<i>Nigerian Veterinary Research Institute</i>		
	Small holders (number of birds)	120,000,000
	Medium and Large (number of birds)	50,000,000
<i>Poultry Association of Nigeria</i>		
	Chicken smuggled in Nigeria (kg)	1,088,621,688
	Chicken smuggled in Nigeria (number of birds)	725,747,792
<i>Sahel capital</i>		
	Nigeria poultry industry (number of birds)	165,000,000
	Poultry consumption in Nigeria (kg)	1,200,000,000
	Consumption (number of birds)	800,000,000
	Imports (number of birds)	635,000,000

Source: Authors estimations from LSMS-ISA 2010, Comtrade data, and reported statistics by Wall Street Journal, Nigerian Veterinary Research Institute, Poultry Association of Nigeria, Sahel Capital, and Corporate Affairs Commission (CAC)

By process of elimination, we thus reach an estimate of 50-75 million birds imported. We believe this to be highly likely given the relative reliability of the above estimates, and the absence of official information on imports of chickens coming into Nigeria. That absence is due to imports being illegal in 2010 and having to be thus smuggled via the port or via the Benin border. Our estimate range, about 15% of total consumption, is similar to some hypothesized import levels coming from other sources, as follows.

On the one hand, the Poultry Association of Nigeria posits 725 million (frozen) chickens smuggled per year into Nigeria. This seems to us impossibly high for two reasons. First, 725 million is already several times higher than total consumption per the LSMS. Second, because it seems like an immense logistical challenge to smuggle such a large number of frozen birds over the border; it would require many thousands of large vehicles passing the borders with a few each few minutes each day all year.

On the other hand, estimates from Wall Street Journal sources, and from Comtrade (which tracks all countries exports of chickens directly to Nigeria (with the bulk from Benin, Holland, and Brazil) and indirectly to Nigeria from Benin (with our assumption noted of what share of those may go to Nigeria), range from only 10 million to 75 million chickens. That appears to indicate that imports in the neighborhood of 50 million birds make sense in light of domestic consumption and production noted above.

5. Rapid Emergence of medium/large farms & vertically integrated companies

Figure 4 shows the emergence of medium/large poultry farms over the past three decades, and Table 2 shows their distribution over space. While the CAC list on which this is based may underestimate these farms and firms, partly because it relies only on formal registrations and partly because, as noted above, it does not list large integrated enterprises such as Zartech, there are several interesting points that emerge.

First, the figure shows that medium/large poultry farms had a brief emergence in the 1980s and stagnated for the 1990s and 2000s at about 400 farms. Then, around 2008, there was at first a gradual, and then from 2010, a steep take-off of farms to reach about 1000 by 2015. These are domestic capital firms, not FDI.

We surmise that this take-off could be occurring for several reasons.

- Medium and large farms tend to rely on feed concentrates, and their emergence helps and is helped by the tandem rapid growth in the feed industry.
- Our interviews with several medium and large farmers, such as for eggs, revealed that these were urban salaried and sometimes retired investors that set up peri-urban farms, recognizing that urban demand (see below) is rising fast for chicken and eggs.
- Some large operations such as Chi Farms provide day old chicks to these medium farms and other services to help them set up, according to our interviews.

- The Bird Flu in 2006/7 may well have helped the emergence of these medium farms. This was stated in an interview with a medium egg producer who noted that medium farms with careful handling practices emerged in the market to compete with small operations that lost position in the crisis. This is similar to similar episodes in the US and Asia after disease or food safety crises.

Second, the Table shows that 60% of the medium/large registered farms are located in the South (and two-thirds of those are in the Southwest Zone, serving Lagos and Ibadan). Compare that with but 40% of the small farm chickens being in the South. This concentration is clearly linked to the concentration of large feed mills in the South and roughly 60% of the urban population of Nigeria.

6. Dominance of Urban Demand: Importance of Rural-Urban Chicken/Egg Value Chain

Table 3 shows chicken consumption and Table 4 egg consumption in 2010 by rural versus urban and North versus South. Table 5 shows chicken consumption and Table 6 egg consumption in 2010 from the LSMS data, by geopolitical zone. The term “conditional” means results taking into account only those who consumed some chicken per the survey, unconditional means we take into account the whole sample including the non-consumers of chicken (in the week of recall of the survey).

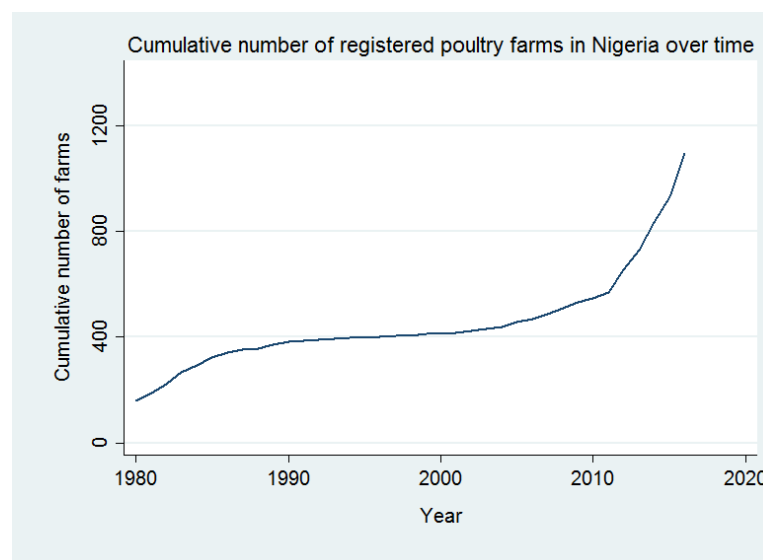
In this section we focus on the urban versus rural results. In the following section we focus on the regions (North and South) and geopolitical zones (parts of regions) results.

Several points emerge from the survey data and our extrapolation of the results to a national level.

First, the chicken consumption level per capita in urban areas is some 17% above rural areas; for eggs, the figure is 400% more. These differences make sense given urban incomes are higher than rural incomes.

Second, based on the current urban population share (calculated by OECD in 2015) of 50% urban, we calculate that roughly 60% of the chicken and 70% of the eggs in Nigeria are consumed by urban consumers. This is similar to findings in Asia showing that the urban share of consumption of income-sensitive foods (non-grains) exceeds the population share of urban areas, and over Asia the urban areas have some two-thirds of the non-grain food consumption. That implies that in Nigeria, as in Asia, the main market the poultry and egg farmer faces is the urban market. That also implies rural-urban value chains for these products are very important to national food security.

Figure 4



Source: Generated by authors from the Nigerian Corporate Affairs Commission (CAC) list of registered poultry farms in Nigeria. Note: Farms still undergoing registration are excluded

Table 2: The distribution of registered medium and large farms in Nigeria across geopolitical zones

Geopolitical Zone	Number	Percentages
North central	136	14.0
North east	41	4.2
North west	220	22.6
South east	115	11.8
South south	93	9.6
South west	369	37.9
Total	974	100.00

Source: Authors' estimations from the Corporate Affairs Commission data from 1980 to 2016

Notes: The table includes only listed farms with clear farm location.

Table 3: Average chicken consumption in Nigeria in 2010 using LSMS-ISA data (rural vs. urban and north vs. south)

	Mean			
	Urban	Rural	North	South
Chicken consumption in kg/person/year (unconditional)	2.7	2.3	2.8	2.1
Chicken consumption in kg/person/year (conditional)	15.5	17.8	17.2	16.1
Share of total number of chickens produced in number of birds (conditional)	0.1	0.9	0.6	0.4

Source: Authors' estimations from the LSMS-ISA 2010 data. Notes: Unconditional consumption includes zero consumption values while conditional is restricted to non-zero consumption levels. Values beyond the 95th percentile are capped at the median value.

Table 4: Average egg consumption in Nigeria in 2010 using LSMS-ISA data (rural vs. urban and North vs. South)

	Mean			
	Urban	Rural	North	South
Egg consumption in kg/person/year (unconditional)	1.3	0.3	0.4	0.8
Egg consumption in kg/person/year (conditional)	6.3	4.2	6.0	5.7

Source: Authors' estimations from the LSMS-ISA 2010 data. Notes: Consumed quantities of more than 15 eggs/person/week is capped with the median value.

Table 5: Average chicken consumption in Nigeria in 2010 using LSMS-ISA data (national/overall and by geopolitical zone)

	Mean							
	N Total	Overall	North central	North east	North west	South east	South south	South west
Chicken consumption in kg/person/year (unconditional)	4970	2.4	3.2	3.3	1.9	1.1	2.0	3.0
Chicken consumption in kg/person/year (conditional)	697	16.6	16.7	17.7	17.5	17.1	18.0	15.3

Source: Authors' estimations from the LSMS-ISA 2010 data. Notes: Unconditional consumption includes zero consumption values while conditional is restricted to non-zero consumption levels. Values beyond the 95th percentile are capped at the median value.

Table 6: Average egg consumption in Nigeria in 2010 using LSMS-ISA data (national/overall and by geopolitical zone)

	Mean							
	N Total	Overall	North central	North east	North west	South east	South south	South west
Egg consumption in kg/person/year (unconditional)	4970	0.6	0.4	0.2	0.5	0.5	0.7	1.2
Egg consumption in kg/person/year (conditional)	557	5.7	4.3	5.1	8.9	7.4	4.0	6.2

Source: Authors' estimations from the LSMS-ISA 2010 data. Notes: Consumed quantities of more than 15 eggs/person/week are capped with the median value.

7. There are regional and zone differences in chicken and egg consumption and production – with the North playing a large role

First, the North consumes more chicken (about a third more) per person, but half the eggs, compared with the South. This goes along (roughly) with the North having more chicken production (see below), but lower income (that could influence egg consumption).

Second, while chicken consumption among chicken consumers does not differ much over zones (hovering around 15-18 kg/person/year), the fact that there are widely varying shares of chicken consumers among all consumers over zones makes it that there are wide differences in per capita chicken consumption over zones for the whole sample. For example, the Southwest and the North Central and Northeast all have around 3 kg/person, while the Northwest and South-South have but 2, and the Southeast, 1.

For egg consumption, there is also a lot of variation. Again, for those who consume eggs, the shares vary around 4-6 kg per year per person (with an outlier only in the Northwest with higher). But when viewed for the whole sample, the average kg vary from a low of 0.2 in the Northeast to 0.4-0.6 in all the other zones except the Southwest with a very high 1.2.

In general, these zone results reflect either urban density (Southwest) or relatively widespread production (Northern results).

Third, Tables 7 and 8 show the shares of population of the various zones (in the total population of Nigeria) and the shares of chickens produced over the zones (with the shares of the zones adding to 100% for the country). Table 3 also shows the share of chickens produced accounted for by North versus South (and urban versus rural).

The tables show that the population shares of the six zones (three in the North and three in the South) are roughly similar. But in terms of distribution of small farmers' chicken holdings, we see that the North has about 60% and the South but 40% (roughly similar to the population shares of the North and South in Nigeria's total population). This appears surprising to us given the conventional wisdom that as the North is poorer, it would have far lower holdings of livestock such as chickens. These findings imply that programs to help small chicken producers are as important in the North as in the South.

A final aside on the production results is that 90% of the chickens are produced in rural areas, and only 10% in urban areas. "Urban agriculture" is minor in this case.

Table 7: Population share in Nigeria in 2010 using LSMS data (by geopolitical zone and rural vs. urban)

	Mean					
	North central	North east	North west	South east	South south	South west
Population shares	0.16	0.16	0.18	0.16	0.16	0.18

Source: Authors’ estimations from the LSMS-ISA 2010 data. Notes: The shares are constructed using the whole sample (unconditional)

Table 8: Share of chicken production volumes across geopolitical zones in Nigeria in 2010 using LSMS-ISA data

	Total N	Mean					
		North central	North east	North west	South east	South south	South west
Share of total number of chickens produced in number of birds (conditional)	1796	0.21	0.21	0.21	0.21	0.10	0.07

Source: Authors’ estimations from the LSMS-ISA 2010 data. Notes: Conditional numbers are restricted to households with non-zero poultry holdings

8. Closer to town, there is more chicken production per chicken farm

Table 9 shows consumption and production of chicken and eggs by distance from the “nearest major market” based on the 2010 LSMS data. This is basically equivalent to distance from town and city centers where the great majority of these major markets are. From location theories such as von Thünen, one would expect for a perishable product targeted disproportionately at urban markets, to find more production and even consumption closer to towns rather than far.

We find for chicken production that this is clearly the case in the South, where chicken holdings plummet as one moves from near the town (in the 10th percentile of distance), with 18 chickens, to a mere 12 far from the town. By contrast, in the North one does not see this differentiation strongly – falling only a little from 23 birds near the town to 20 far from the town. This is interesting in two ways. On the one hand, we see that small farms in the North that are in the

“hinterland” actually have twice as many birds as small farms far from the towns do in the South. This demonstrates the importance to small farmers of chicken production in the North. On the other hand, it shows the relative “pull” factor of South urbanization on inducing chicken farming – thus taking advantage of this market opportunity.

Note that for chicken consumption, there is far less variation over space radiating out from the town. This can be explained by substantial diffusion of chicken holdings by farms out into rural areas. By contrast, the drop is relatively sharp from the 50th to 90th decile of distance in the South, implying that both consumption and production are relatively spatially concentrated toward the big demand magnets of the urban and peri-urban areas.

By contrast, the effect of movement from near the town to far from the town is very sharp in both the North and the South. The ratio of the 10th to the 90th decile in the North is nearly 3 fold, while in the South it is just 1.3. This could be explained by the much better infrastructure radiating out to rural areas in the South compared with the North. This implies that the boom in egg demand as incomes rise and urbanization proceeds is best availed where there is significant investment in rural infrastructure, probably especially rural feeder roads.

Table 9: Consumption and production of poultry products by distance to nearest major market in Nigeria in 2010

	Total N	Median					
		North			South		
		10th	50th	90th	10th	50th	90th
Chicken consumption in kg/person/year (conditional)	697	12.0	13.0	13.0	13.0	14.9	8.9
Egg consumption in kg/person/year (conditional)	557	4.90	1.7	1.70	3.9	3.80	3.1
Number of birds holdings (conditional)	1796	23.0	20.0	20.0	18.0	14.0	12.0

Source: Authors’ estimations from the LSMS-ISA 2010 data. Notes: Conditional consumption is restricted to non-zero consumption levels while bird holdings are restricted to households with non-zero poultry holdings. Egg production data was not available in the LSMS-ISA data

9. Conclusions and policy implications

This report used data from multiple sources to show dynamic growth and transformation taking place in the Nigerian poultry subsector. Our key findings are as follows:

- Increased consumption of poultry products in Nigeria is occurring alongside rapid urbanization and growth in the industry. In just one decade, the volume of feed used in Nigeria skyrocketed from 300 thousand to 1.8 million tons – a 600% climb. Most of the maize (a key ingredient in feed) is produced in the North but serves feed mills across the entire nation. The long north to south supply chain for feed is a benefit and opportunity for the North and a boon for the South that warrants further attention. Weather (short term shocks and long term climate change), fuel shortages, transport costs, and socio-political disruptions make a long supply chain from North to South vulnerable without adequate efforts to improve its resilience.
- Contrary to the idea that Nigeria is inundated with illegal imports of poultry products, we find that domestic production covers about 85% of domestic consumption, and (illegal) imports appear to be only about 15% of consumption. Thus efforts towards enforcing the ban and addressing illegal smuggling of poultry products should be supplemented with at the very least equal effort to support the sustainable growth of domestic poultry production in Nigeria.
- Though population shares of the six geopolitical zones in the country are roughly similar, we see that the North has about 60% of the small farmers' chicken holdings versus 40% in the South. This was surprising given the conventional wisdom that the majority of chicken production in Nigeria is in the South west and the idea that as the North is poorer, it would have far lower holdings of chickens. This implies that programs to help small chicken producers are at least as important in the North as in the South. Appropriate policies within the subsector could play a significant role in improved welfare of households in the North as well as the South which tends to get more attention as far as poultry production is concerned, possibly because medium/large operations cluster there.
- In the South, we find evidence that both consumption and production are relatively spatially concentrated toward the big demand magnets of the urban and peri-urban areas. This implies that the boom in egg demand as incomes rise and urbanization proceeds is best availed where there is significant investment in rural infrastructure, probably especially rural feeder roads.

Our analysis also confirms that there is a huge data gap in available field survey data on the poultry value chain in Nigeria. There is limited information about the behavior of actors all along the value chain. Reliable policy analysis requires the collection of more data as the current data is very limited with numerous inconsistencies. Consequently, next steps include the design and implementation of “stacked surveys” where data will be systematically collected from representative samples along all the segments of the chicken and eggs value chains in Nigeria. This will enable rigorous policy analysis to be conducted at each node with due attention paid to interactions within and across nodes.

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